BridgeX® GT Series BX5020 Gateway IB to Ethernet Hardware User Manual

P/N: MBX5020-1SFR

Rev 1.8

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Revision History

Table 1 - Revision History Table

Date	Revision	Description
Sept. 2012	1.8	Changed section 2.2.4 Added transceivers and optical modules
Dec. 2011	1.7	Added " and up to 4096 virtual NICs using LAG" Added LACP as a supported feature
Oct. 2011	1.6	removed D spanning tree in 2 places Added "Hardware" to the title
August 2011	1.5	Added Acoustic numbers
August 2011	1.4	Updated Power numbers Added Power as heat in BTUs/hr
June 2011	1.3	Removed references to FC
June 2011	1.2	Minor fixes
Feb. 2011	1.1	New power numbers New I2C section
Sept. 2010	1.0	Initial release

About this Manual

This manual describes the installation and basic use of Mellanox BridgeX MBX5020 Gateway products and development platforms based on the MT68102 BridgeX gateway device.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up BridgeX gateways from InfiniBand to Ethernet fabrics and networks.

The manual assumes familiarity with the InfiniBand® Architecture Specification as well as the Ethernet Architecture.

Related Documentation

Additional documentation available from Mellanox is provided in Table 2.

Table 2 - Reference Documents

BridgeX Programmer's Reference Manual *Document # 2936PM*	User guide describing the interface used by developers to write a driver between system software and the Mellanox BridgeX device.
FabricIT BX Management Software CLI User's Manual	User manual describing the software interface including examples for using the BX manager and for installing EoIB and FCoE Host stacks. www.mellanox.com > Products > Gateway Software > Software and Documentation Download. You will need a valid Mellanox Gateway S/N.
Mellanox Firmware Tools (MFT) User's Manual *Document # 2329*	The MFT (Mellanox Firmware Tools) package is a set of firmware tools. The manual supplied with this package provides an overview of the firmware its installation and replacement. The MFT can be downloaded with its documentation at: www.mellanox.com > Support > Download Firmware Tools

Conventions

The terms uplink (internal) and downlink (external) are used throughout the document. Uplink refers to the server switch facing ports, where InfiniBand (IB) is used. Downlink refers to the Local Area Network (LAN) switch facing ports, where Ethernet (EN) are used.

Caution: This symbol indicates the possibility of physical injury to the user or installer.

This symbol indicates information that is helpful to the user.

Gateway Products Covered in this User Manual

Table 3 - Gateway Products Covered by this User's Manual

Family	Product Number	Description
BridgeX IB Gateways	MBX5020	BridgeX IB system, dual controllers, 4 QSFP uplink ports and 16 SFP+ downlink ports with CPU, RoHS6

Mellanox Part Numbering Legend

Table 4 - Part Numbering Legend

Place	Field	Decoder
M		Mellanox Technologies
BX	System Type	= BridgeX based Bridge System
1	Gateway protocols	1 = Ethernet Uplinks 5 = InfiniBand Uplinks 9 = VPI (Ethernet and InfiniBand) Uplinks
0	For future use	
2	# of BridgeX devices	1 = For future use 2 = 2 BridgeX devices
0	For future use	
–	Separator	
1	# Power Supplies	1=1, 2=2
M	Depth of the Unit	S = standard depth, B = For future use
Y	Air Flow direction	R= connector (IB/ETH) side to PSU side airflow F= PSU side to connector (IB/ETH) side airflow
R	RoHS	C=RoHS5, R=RoHS6

1 Overview

The Mellanox BridgeX gateway series is a 1U, top-of-rack gateway that provides server I/O consolidation over an InfiniBand network. The product supports 40Gb/s InfiniBand to 1GbE/10GbE Ethernet bridging.

The BridgeX Gateway is a multi-protocol bridge that enables InfiniBand connectivity to native Ethernet networks. The gateway implements stateless bridging protocols by encapsulating Ethernet over InfiniBand (EoIB) acting as a packet relay, based on read-only context. Bridging with the gateway requires the use of Mellanox ConnectX or ConnectX 2 adapters on the server to implement server side processing of EoIB protocols. EoIB capable ConnectX and ConnectX 2 adapters present standard Ethernet (Sockets) software interfaces to server applications providing transparent connectivity for existing Enterprise Data Center (EDC) and High Performance Computing (HPC) applications to Ethernet LAN. ConnectX and ConnectX 2 adapters also present a standard InfiniBand (Verbs) software interface to server applications for Inter Process Communication (IPC). This allows Ethernet and InfiniBand payloads to be carried over a common converged high performance 40Gbps InfiniBand fabric without any changes to existing server applications. Data on the converged fabric requiring access to Ethernet LAN is bridged by the gateway preserving existing LAN investments and management practices.

The BridgeX gateway along with ConnectX and ConnectX 2 adapters converge different networks onto a single fabric, reducing the number of adapters, cables and switch ports by a factor of three and reducing capital expenditure. The high port density of the gateway, within a 1U form factor, low power consumption, and ease of management also reduces operating expenses.

Figure 1: MBX 5020 Gateway

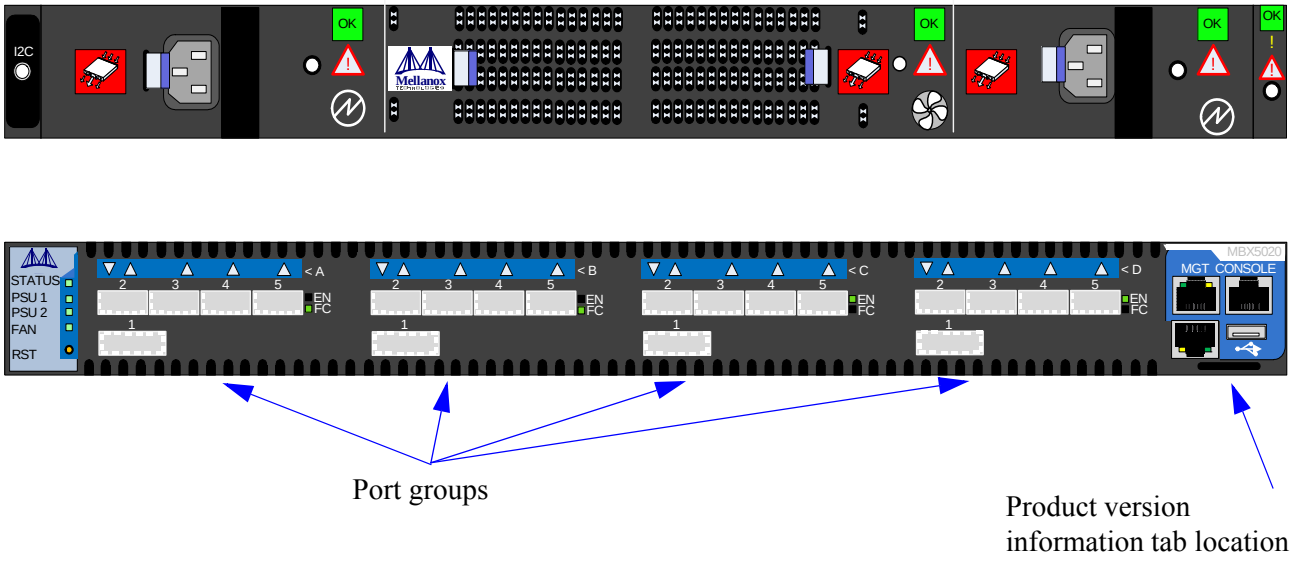
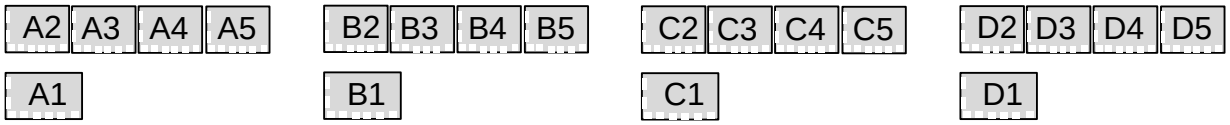


Figure 2: Port Numbering



1.1 Features

The BridgeX Gateway series has the following features:

Uplink ports

- 4 ports of 40/G InfiniBand QSFP

Downlink ports

- 12 ports of 1 GbE /10 GbE Ethernet
- Down link ports are configured in groups of 3
- Down link ports within a group must run the same protocol
- A down link port group running Ethernet must run the same speed on all ports within the group (10Gbps or 1Gbps)

1024 virtual NICs per Ethernet port and up to 4096 virtual NICs using LAG

Total of 16,000 MAC addresses

Ethernet ports

- IEEE 802.3ae 10Gigabit Ethernet support
- IEEE 802.3z Gigabit Ethernet
- IEEE 802.1p QoS / COS
- IEEE 802.1Q VLAN Tagging
- IEEE 802.1AB Link Layer Discovery *
- IEEE 802.3ad Link Aggregation with LACP
- IEEE 802.3x Flow Control (Per Priority Flow Control)
- Virtual lanes support
- Jumbo Frames up to 9K support

* This feature will be available to customers in the near future.

Connectors and Cabling

- SFP/SFP+ connectors for downlink to 1 GbE ports and to 10GbE ports
- Optical transceiver modules for SR and LR for Ethernet

Indicators

- Per port status LEDs; Link Activity

- System status LEDs: system, fans, power supply
- Ethernet indicators for downlink port groups

Management Options

- 2 – 1000BASE-T Ethernet ports

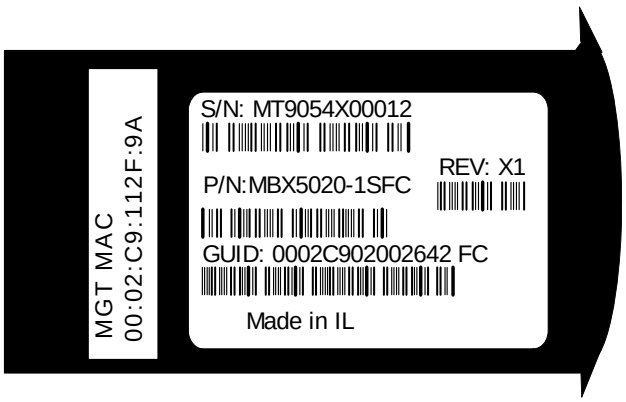
Power Supply

- Dual redundant slots
- 1 PSU is required for device functioning

1.2 Serial Number and Product Version Information

The serial number and product version information are found on the label seen in the figure below. The product version information tab location is on the connector (IB/ETH) side of the gateway on the bottom right hand side. See Figure 3 on page 12 for a sample of the product label. See Figure 1 on page 10 for the product label tab location.

Figure 3: Generic Product Label



1.3 Gateway Port Groups

There are four gateway groups in the BX5020 identified as A, B, C and D. Each gateway group consists of one QSFP uplink port and four SFP+ down link ports. Each gateway group can be independently configured. Within each gateway group, the QSFP uplink ports can be either 10Gbps, 20Gbps, or 40Gbps InfiniBand and the SFP+ downlink ports can be either 1Gbps or 10Gbps Ethernet.

Table 5 - BX5020 Gateway Port Grouping, Protocols and Speeds

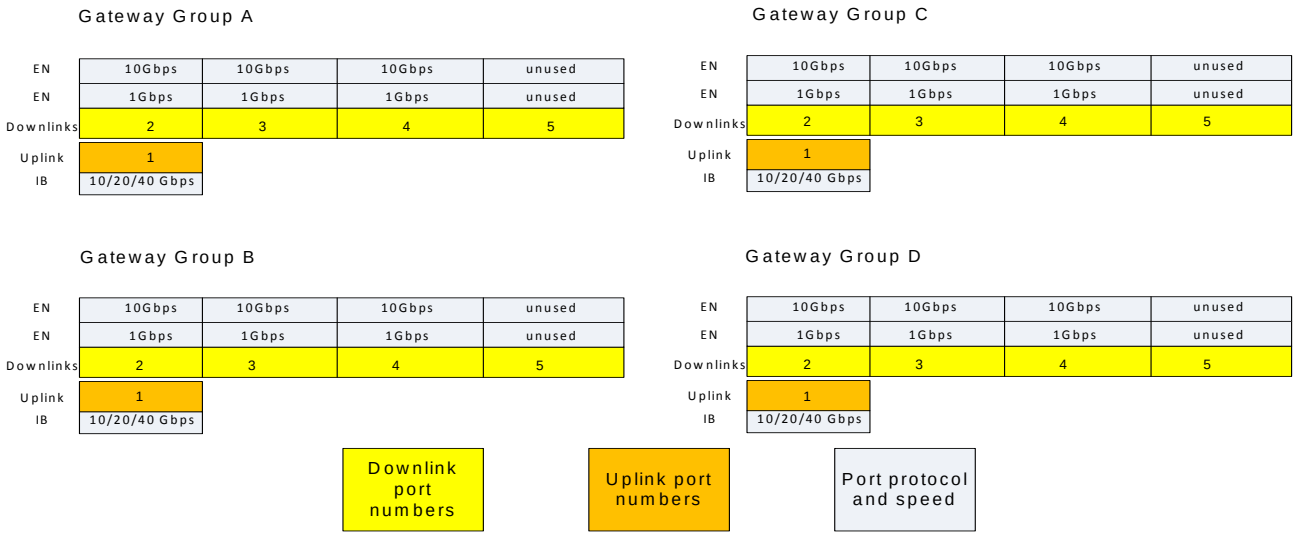
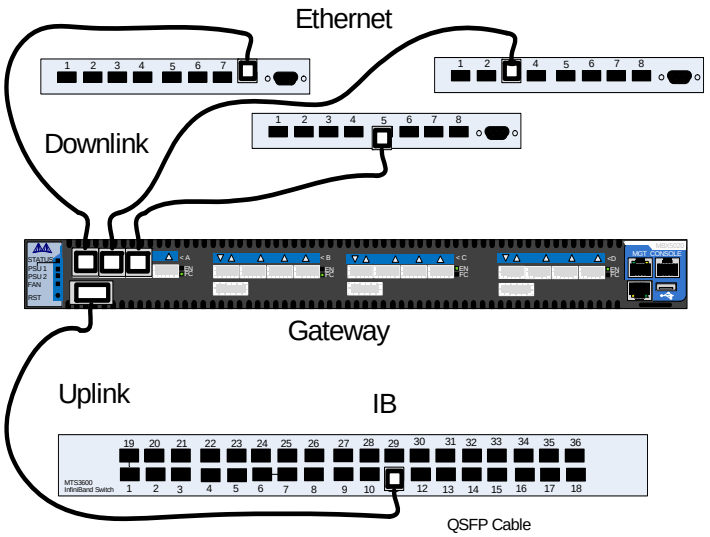


Figure 4: Example of a Setup Showing a Port Group



2 Installation and Basic Operation

2.1 Unpacking the Gateway

Before you install your new BX5020, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damage that may have occurred during shipping.

If anything is damaged or missing, contact your customer representative immediately.

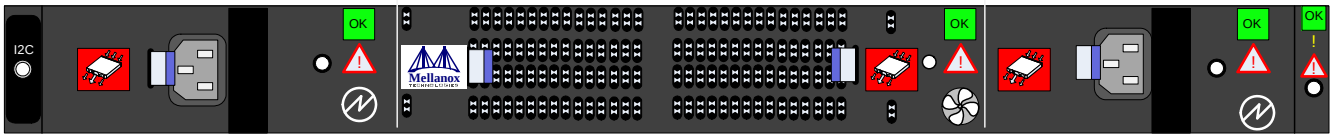
See the package contents in Section 2.3.

2.2 BridgeX Gateway Hardware Overview

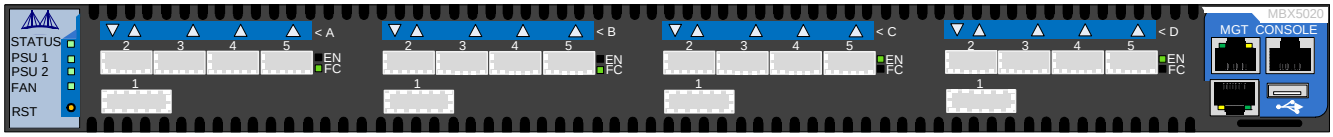
The figures below show dual hot-swap power supplies, 1 I2C connector, various status LEDs, and the hot-swap fan module on the power side. The RS232 CONSOLE, 2 Management GbE connectors, one USB connector, and various status LEDs on the connector (IB/ETH) side.

Figure 5: Gateway System Connector and Power Side Panels

Power Side



Connector (IB/ETH) Side



All connectivity is via the connector panel. All connectors can support active cables.

2.2.1 Downlink Ports

There are four downlink ports per gateway port group. These ports support SFP/SFP+ cables and transceivers.

Only Mellanox Transceivers and Optical Modules specifically designated as verified to work with the gateway are guaranteed to perform.

When configured for Ethernet, only 3 of the 4 downlink ports per gateway group are used and all downlink ports within the gateway group must have the same speed, that is, 1Gbps or 10Gbps. See Table 5 for the port numbers of the active Ethernet ports.

2.2.2 Uplink Ports

There is one uplink port per gateway port group. This port has a QSFP Connector. These connectors have support for powered cables and media adapter circuits. All of the Uplink ports must be InfiniBand.

2.2.3 Configuring the Port Gateway Groups

See the FabricIT BXM Management Software CLI User Manual for CLI commands to configure the gateway. You can also configure the gateway using the WebUI.

2.2.4 Making Connections to Other Formats

Hybrid CX4 to QSFP cables are supported on the uplink side. Transceivers and optical modules are supported on the downlink side.

- SFP+ modules for 10GbE
- SFP modules for 1GbE

Table 6 - Available Transceivers and Optical Modules

Part Number	Form Factor	Application	Connector	Cable Length (up to)	Wavelength
MFM1T02A-SR	SFP+	Ethernet 10GbE	LC-LC	300m	850nm
MFM1T02A-LR	SFP+	Ethernet 10GbE	LC-LC	10km	1310nm
MC3208011-SX	SFP	Ethernet 1GbE	LC-LC	500m	850nm
MC3208411-T	SFP	Ethernet 1GbE	RJ-45 Base T	100m	

Only Mellanox Transceivers and Optical Modules specifically designated as verified to work with the gateway are guaranteed to perform.

2.2.5 Inserting the Optical Transceiver Module

To insert the module into the cage:

1. Open the module's locking mechanism– see Figure 6 and Figure 7.
2. Make sure that the male connectors on the module will align with the female connectors inside of the cage. Also check that there is no dirt or foreign matter in the module or in the cage.

Figure 6: Module with Locking Mechanism Closed

Figure 7: Module with Locking Mechanism Open

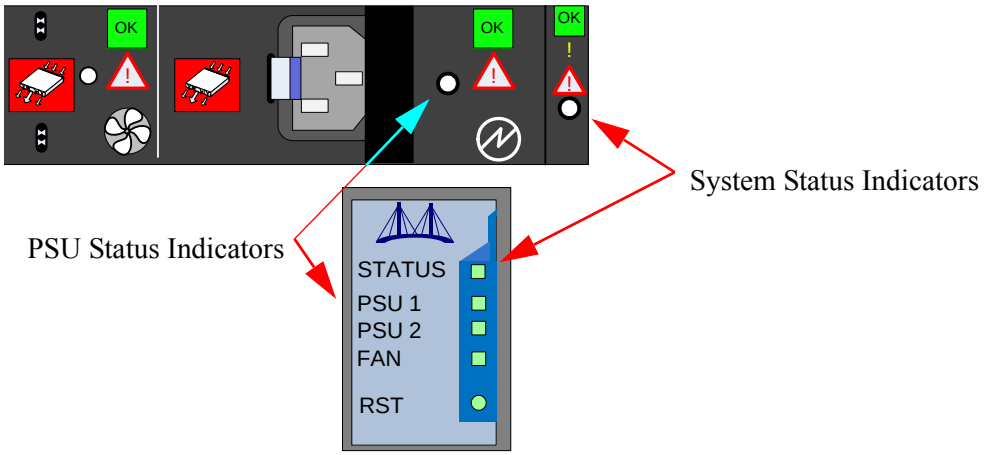
3. Insert the module into the adapter card module cage.
4. Close the locking Mechanism.

To remove the module from the cage:

1. Unlock the locking mechanism by opening the handle.
2. Pull the module out of the cage.

2.2.6 Status LEDs

Figure 8: Power and System LEDs



2.2.6.1 System Status Indicators

Status indicators are located on the right side of power side panel and on the left side of the connector (IB/ETH) side panel. Both of these system status indicators are three color LEDs, displaying the same status on both sides of the gateway. The following status conditions are possible.

Table 7 - System Status LED Configurations

LED Configuration	STATUS/ System Health LED Description
Green	OK – The system is up and running.
Yellow	Error –A fault in the system, most likely the firmware did not BOOT properly.
Red	Major Error –Possible damage can result to the gateway. Turn off immediately. For example; bad FW, can't boot, or overheated Note: When the system is turned on, the red LED will light up for up to two minutes, until the CPU is up and running.
Off	Off – The system has no power.

If the STATUS LED shows red after five minutes unplug the gateway and call your Mellanox representative for assistance.

If the FAN LED shows red, troubleshoot the fan module.

If the gateway shuts down due to over temperature, unplug the gateway, wait 5 minutes and replug in the gateway.

2.2.6.2 Fan Status Indicators

The fan unit is located in the center of the power side panel. The fan unit has a single 2 color LED to the right of the fan, that indicates the internal status of the unit.

An identical indicator labeled "Fans" is located on the left side of the connector (IB/ETH) side panel. The following fan status conditions are possible:

Table 8 - Fan LED Configurations

LED Configuration	Fan LED Description
Green	OK – The system is up and running.

Table 8 - Fan LED Configurations

LED Configuration	Fan LED Description
Red	Error –One or more fans is not operating properly. The system should be powered down and troubleshoot the fan module.
Off	Off – The fan unit is not receiving any power. Check that the fan unit is properly and completely inserted.

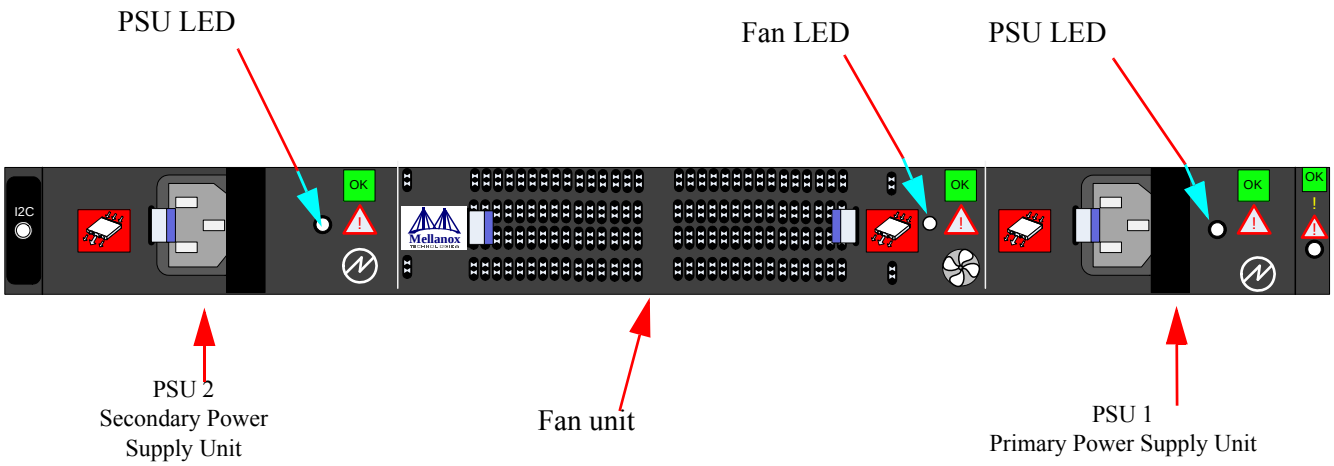
All fans must be operating while the power supply is plugged in.

If the gateway shuts down due to over temperature, unplug the gateway, wait 5 minutes and replug in the gateway.

2.2.6.3 Power Supply Status Indicators

The gateway is available with one or two factory installed Power Supply Units. For gateways with only one unit installed, a second Power Supply Unit can be added to increase security, hot-swap ability and to add redundancy. See Section E, “Replacement Parts Ordering Numbers,” on page 25 for ordering part numbers.

Figure 9: BX Gateways Power Side Panel



The primary power supply unit (PSU1) is located on the right side of the power side panel, with PSU2 on the left side. Each PSU also has a single 2 color LED to the right of the PSU, that indicates the internal status of the unit.

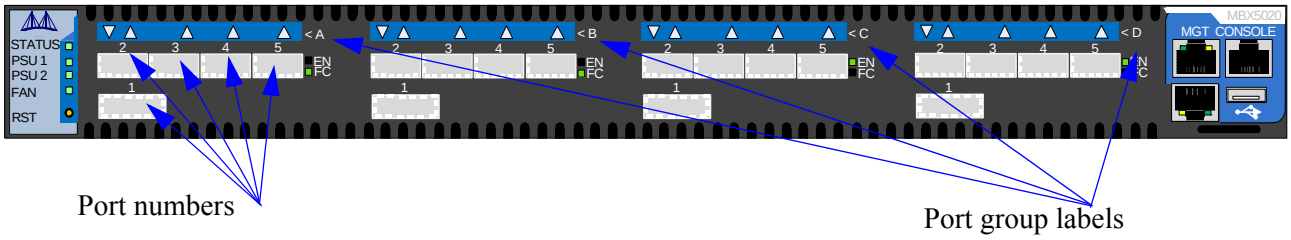
PSU status indicators are also located on the left side of the connector (IB/ETH) side panel, and labeled “PSU1” and “PSU2”. Table 8 Shows the explanation of the PSU Status LED colors.

Table 9 - PSU Status LED Configurations

LED Configuration	PSU LED Description
Green	OK – The Power supply is delivering the correct voltage. 12VDC
Red	Error – The PSU is not operational. Replace the PSU.
Off	Off – There is no power to the system (neither PSU is receiving power). If one PSU is showing green and the second PSU is unplugged it will show a red indication.

2.2.7 Port Connector LEDs

Figure 10: Connector Port Identification



Above the ports are two LEDs one for the upper port ▲ and one for the lower port ▼. The following table shows the port status according to the LED indication.

Table 10 - Port Connector LED Assignment

LED Configuration	Port Connector LED Description
Off	No power to the port.
Solid Green	Logical link up
Flashing Green	Data activity flashing speed ≈ data transfer speed
Orange	Physical link up
Flashing Orange	A problem with the physical link

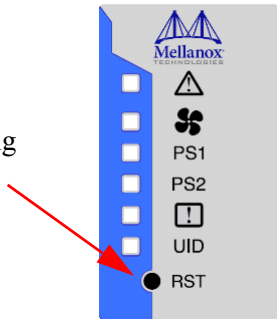
2.2.8 Reset Button

On the connector side panel under the system LEDs is a reset button. This reset button requires a tool to be pressed.

DO NOT use a sharp pointed object such as needle or push pin for pressing the Reset button. Sharp objects can cause damage, use a flat object to push the reset button.

Figure 11: Reset Button

Press the reset button to reset the main and management CPUs and to delete the existing password.



This button resets both the CPU of the switch device and the CPU of the management module. It thereby resets all of the ports by bringing them down and powering them up when the button is pushed. A quick push of this button performs this reset. When the button is held down for 15 seconds the switch is reset and the password is deleted. You will then be able to enter without a password and make a new password for the user *"admin"*.

2.2.9 Air Flow

These gateways can come with two air flow patterns. The two patterns are

- connector (IB/ETH) side inlet to power side outlet
- Power side inlet to connector (IB/ETH) side outlet

The air flow is specified in the product model number. See "Mellanox Part Numbering Legend" on page 9. On the PSUs and fan modules the air flow direction can be seen on the power side panel.

Table 11 - Air Flow Direction

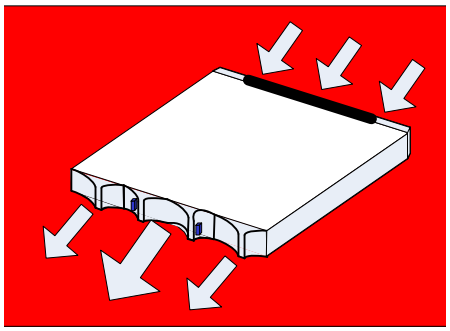
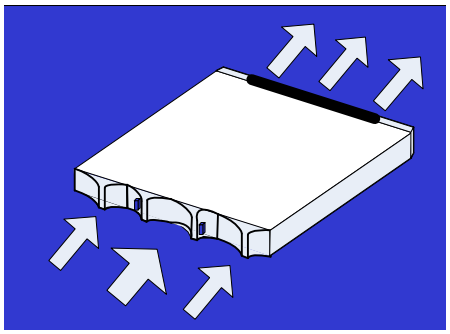
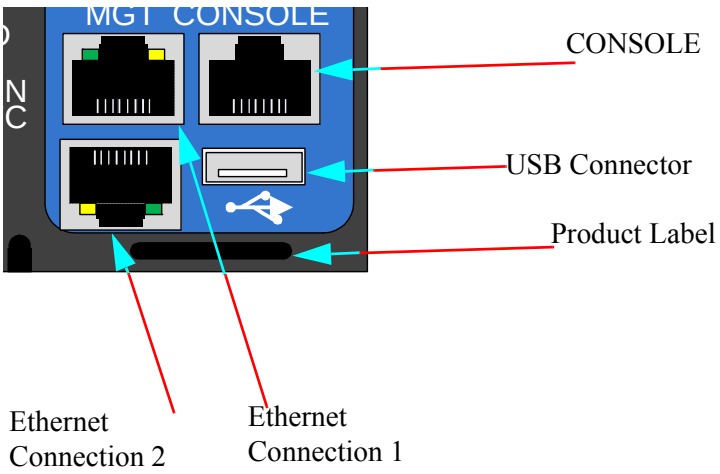
Picture	OPN Designation	Description
	R	connector (IB/ETH) side inlet to power side outlet

Table 11 - Air Flow Direction

Picture	OPN Designation	Description
	F	Power side inlet to connector (IB/ETH) side outlet

2.2.10 Management Interfaces

Figure 12: Management Interfaces



The following interfaces allow access to the management module.

2.2.10.1 "CONSOLE" RS232 RJ45 Connector

This RS232 connection provides access for local management through connection to a host. The BX series gateways can be connected to the RJ45 connector of a computer. This connection is needed for the initial configuration of the gateway. For the initial configuration procedure for the gateway see the Installation Guide.

2.2.10.2 MGT Ethernet Connector

The gateway has two Ethernet connectors. This Ethernet connection provides access for remote management. The BX series gateways can be connected to a network through the RJ45 connectors. There are two GbE connectors. Their MAC addresses can be found on the product version label

tab. See Figure 3 on page 12 for the location of the tab. The two MAC addresses are consecutively numbered.

Each Ethernet port gets connected to Ethernet switches. Ethernet switches must be configured to 10/100/1000M auto-negotiation.

2.2.10.3 I2C Connector

There is an I2C connector on the far left of the power side of the gateway. This connector is for FAEs only.

This interface is for troubleshooting and debugging for FAEs only.

2.3 Package Contents

The package should include all of the following parts:

- BridgeX Gateway
- Installation kit for 19” Rack mounting
- 1 power cable for each PSU Black 250v 10a 1830mm C14 To C13
- RS232 RJ45 to DB9 2 meter cable

2.4 Gateway Installation and Operation

Installation and initialization of the gateway are straightforward processes, requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment.

The gateway requires programming and configuration to operate as a basic InfiniBand to Ethernet gateway. The gateway includes all of the necessary functionality to operate with external standard Subnet Management software.

This section describes the installation process and basic operation of the gateway. Please first read the warnings sub-section carefully before carrying on with installation procedures.

If the Gateway is powered off for any reason without using the proper shut down procedure the Flash memory may be corrupted.
If the Flash memory is corrupted the Gateway may fail to boot.

Caution: The gateway will automatically power on when AC power is applied. There is no power switch. Check all boards, power supplies, and fan tray modules for proper insertion before plugging in a power cable.

2.4.1 Installation Safety Warnings

For Safety Warnings in French see Section E,“Avertissements de sécurité d’installation (French),” on page 51, for German see Section F,“Installation - Sicherheitshinweise (German),” on page 54, and for Spanish see Section G,“Advertencias de seguridad para la instalación (Spanish),” on page 57.

1. **Installation Instructions**

Read all installation instructions before connecting the equipment to the power source.

2. **Over-temperature**

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: 45°C (113°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

3. **Stacking the Chassis**

The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.

4. **Redundant Power Supply Connection - Electrical Hazard**

This product includes a blank cover over the space for the redundant power supply. Do not operate the product if the blank cover is not securely fastened or if it is removed.

5. **During Lightning - Electrical Hazard**

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

6. Copper InfiniBand Cable Connecting/Disconnecting

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings and instructions.

7. Rack Mounting and Servicing

When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.

8. Leakage >3.5mA

WARNING: High leakage current; Earth connection essential before connecting supply.

9. Add GND Connection

Before connecting this device to the power line, the protective earth terminal screws of this device must be connected to the protective earth in the building installation.

10. Installation Codes

This device must be installed according to the latest version of the country national electrical codes. For North America, equipment must be installed in accordance to the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

11. Interconnection of Units

Cables for connecting to the unit RS232 and Ethernet Interfaces must be UL certified type DP-1 or DP-2. (Note- when residing in non LPS circuit)

Overcurrent Protection: A readily accessible Listed branch circuit overcurrent protective device rated 20 A must be incorporated in the building wiring.

12. Equipment Installation

This equipment should be installed, replaced, or serviced only by trained and qualified personnel.

13. Equipment Disposal

Disposal of this equipment should be in accordance to all national laws and regulations.

14. Local and National Electrical Codes

This equipment should be installed in compliance with local and national electrical codes.

15. Hazardous Radiation Exposure

Caution – Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CLASS 1 LASER PRODUCT and reference to the most recent laser standards:
IEC 60 825-1:1993 + A1:1997 + A2:2001 and EN 60825-1:1994+A1:1996+ A2:2001

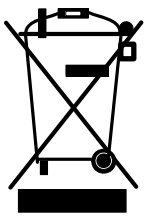
16. UL Approved AC Power Cords

For North American power connection, select a power supply cord that is UL Listed and CSA Certified 3 - conductor, [18 AWG], terminated in a molded on plug cap rated at 125 V, [15 A], with a minimum length of 1.5m [six feet] but no longer than 4.5m.
For European connection, select a power supply cord that is internationally harmonized and marked “<HAR>", 3 - conductor, minimum 0,75 mm^2 wire, rated at 300 V, with a PVC insulated jacket. The cord must have a molded on plug cap rated 250 V, 10 A.

17. Do Not Use The Switch As A Shelf Or Work Space.

Caution: Slide/rail mounted equipment is not to be used as a shelf or a work space.

18. WEEE Directive



According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.
Dispose of this product and all of its parts in a responsible and environmentally friendly way.

2.4.2 Mechanical Installation

The gateway can be rack mounted for installation in a standard 19” rack. Front and back are arbitrary, the rack kit can be mounted so that one side is even with the vertical rack support and the other side is recessed into the rack.

The rack mounting holes conform to the EIA-310 standard for 19-inch racks. Take precautions to guarantee proper ventilation for air intake at the front of the chassis and exhaust at the rear in order to maintain good airflow at ambient temperature. Cable routing in particular should not impede the air exhaust from the chassis.

The gateway can be either front or rear mounted. The notion of “front” and “back” is arbitrary. This document uses the terms power side and connector (IB/ETH) side to reduce ambiguity.

2.4.2.1 Minimum and Maximum Rack Depth for this Gateway

This gateway can go into 19” racks whose vertical supports are between 400mm and 800mm apart. Be sure to order the installation kit to match your rack. Be sure you have the correct installation kit. The Installation Kit must be compatible with the gateway (standard or short gateway) and with the rack (short rack or standard rack).

Table 12 shows the Rack installation kit options. There are three possible rack options. Make sure that you have the Rack installation kit that fits your needs.

Table 12 - Gateway and Installation Kit Options

Gateway and Rack Description	Ordering Part Number
Standard depth gateway standard rack	MIS000085
Short gateway standard rack	MIS000083
Short gateway short rack	MIS000079

2.4.2.2 Installing the Gateway in the Rack

Tools required and customer supplied parts

- Phillips Screwdrivers #1 and #2
- ESD Strap
- ESD mat
- Grounding screw
- Grounding wire sufficient to reach a valid ground

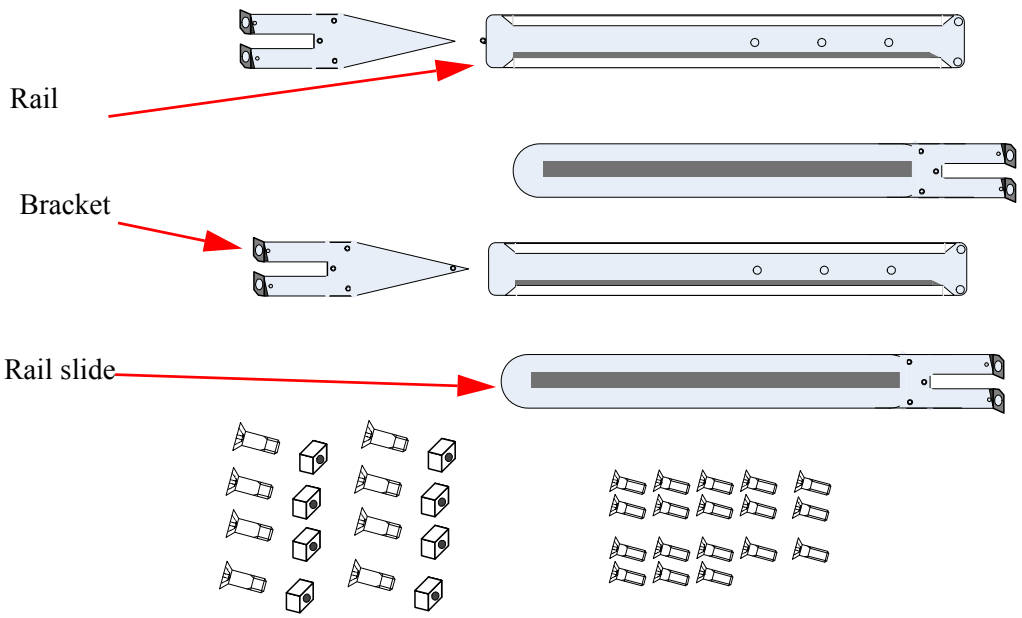
Parts included in the rail kit:

- 2 rails
- 2 rail slides
- 18 recessed flat head screws
- 8 caged nuts

- 2 brackets
- 8 pan head screws M6

1. Place the ESD mat on the floor where you will be working and put on the ESD strap. Make sure the ESD strap is touching your skin and that the other end is connected to a verified ground.

Figure 13: Installation Kit Parts



Before you install your new gateway, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damages that may have occurred during shipping.

If anything is damaged or missing, contact your customer representative immediately.

2. Screw the brackets onto the gateway. Use 3or 4 (depending on the bracket position) flat head screws to connect each bracket to the gateway.

If you need room to bring the power cord from the other side of the rack, recess the gateway and run the power cord through the bracket.The installation kit can be reversed so that the bracket can be installed on either side of the gateway the power side or the connector (IB/ETH) side.

Figure 14: Making Room for the Power Cord

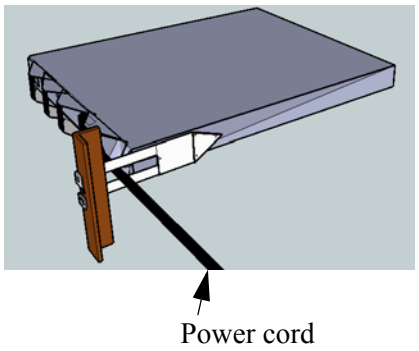
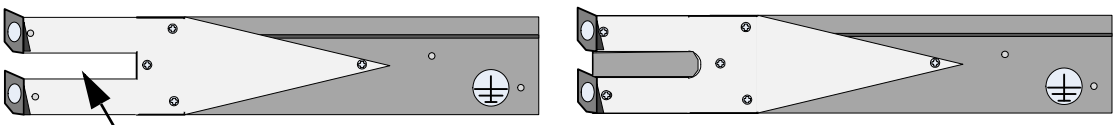


Figure 15: Screwing on the Bracket

In this position the front of the gateway is ~5cm behind the rack vertical support

In this position the front of the gateway is even with the rack vertical support



Place to run the power cable

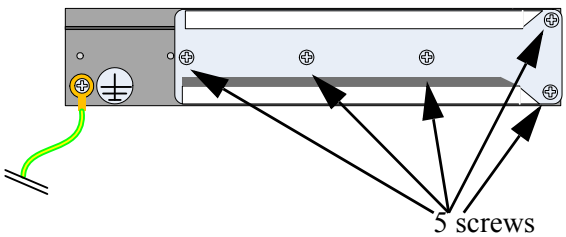
In this position you will use 3 flat head screws

In this position you will use 4 flat head screws

The side of the gateway with these brackets will be the side that is even with or close to the vertical rack support.

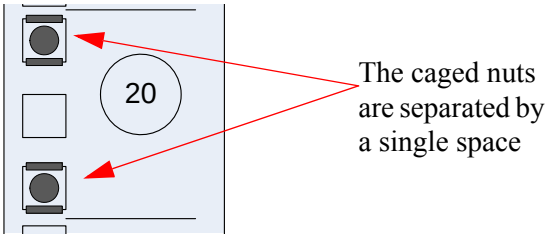
3. Screw the rails onto the gateway. Use 5 flat head screws to connect each rail to the gateway.

Figure 16: Screwing on the Rail



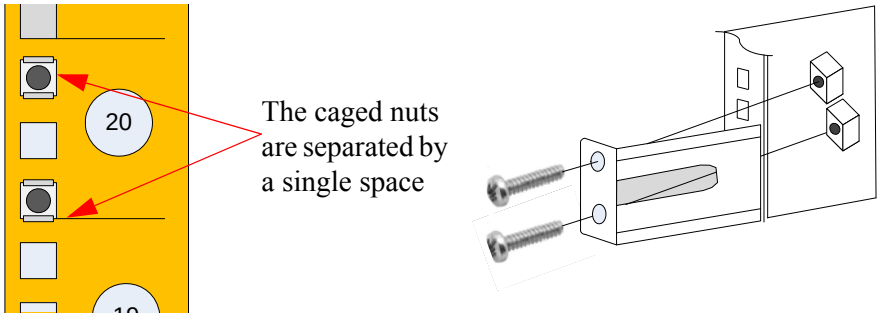
4. Clip 4 caged nuts into the holes in the rack you will be using to connect the rail slides. Check that both sides of the gateway, left and right, are the same level in the rack.

Figure 17: Clipping in the Caged Nuts



5. Clip 4 more caged nuts into the holes in the rack you will be using to connect the brackets. Check that both sides of the gateway, power side and connector (IB/ETH) side, are at the same level in the rack.
6. Using two of the bolts for each rail slide, install the rail slides.

Figure 18: Caged Nut Locations



The rail slides are to be installed on the side of the rack where the gateway will be recessed into the rack.

7. Tighten the bolts to 9.2 Nm or 81.5 pound inches. If the power cable is on this side of the gateway, feed the power cable into the slot in the rail slide before screwing it to the vertical support.
8. Slide the gateway catching the rail slides into the rails on the gateway. If you extended the bracket past the gateway to use the slot for the power cord now is the time to put the power cord through the slot.
9. Screw in the bolts into the caged nuts and tighten the bolts to 9.2 Nm or 81.5 pound inches.
10. Ground the gateway. See Section 2.4.3 for grounding instructions.
11. Plug in the power cord.
12. You can start connecting all of the cables to the gateway.

There is no On-Off switch on the gateway. The gateway will come on when one plug is plugged in.

When the gateway is plugged in, the status LED may be RED for up to two minutes until the system completes booting up.

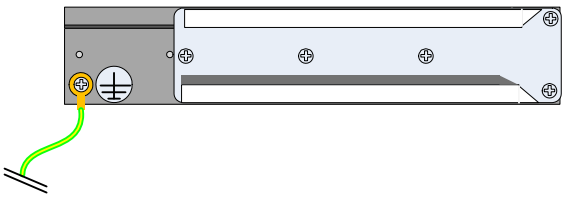
13. Check the Status LEDs and confirm that all of the LEDs show status lights consistent with normal operation.

Warning: Any yellow or red status LED is cause for concern and must be dealt with immediately.

2.4.3 Grounding the Gateway

Make sure to connect the ground post to a valid electrical ground. Use a grounding lug and a ground wire of sufficient capacity to safely convey a potential discharge. A ground wire of AWG 6 or 4mm diameter is recommended for grounding this device. The chassis is concurrently grounded through each of the PSUs. Only connect the PSU cords to properly grounded outlets. Do not rely on the PSU grounds. It is absolutely necessary to connect the grounding post. Make sure the connections are solid and permanent. If you choose to not use the ground screw, make sure that the rack is properly grounded and that there is a valid ground connection between the chassis of the gateway and the rack. Test the ground using an Ohm meter.

Figure 19: Ground Connection



Check to determine if your local or national electrical codes require an external ground to all IT components.

Some national and/or local codes may require IT components to be bonded and externally grounded (not including the power cord ground). You must follow all national and local codes when installing this equipment.

2.4.4 Disassembling the Gateway from the Rack

To disassemble the gateway from the rack:

1. Put on an ESD strap and connect to a valid ground.
2. Shut down the gateway using the procedure in Section 2.4.6.
3. Unplug all power supplies.
4. Disconnect all cables.
5. Disconnect any grounds if hard wired.
6. Unscrew three of the four screws connecting the gateway brackets to the rack.

Support the gateway while you unscrew the last screw. The gateway will drop and could become damaged or it could damage other equipment in the rack.

7. While supporting the gateway unscrew the last screw.
8. Slide the gateway out of the rails. This is easier with two people.
9. Remove the rail/slides from the other side of the rack.

See the Mellanox Website for instructions to disassemble the gateway for proper WEEE disposal.

2.4.5 Power Connections and Initial Power On

The gateway ships with one Power Supply Unit. A second PSU can be ordered for redundancy. Each supply has a separate AC receptacle. The input voltage is auto-adjusting for 100-240 VAC, 50-60Hz power connections. The power cords should be standard 3-wire AC power cords including a safety ground. See Table 15, “Replacement Parts Ordering Numbers,” for ordering the cables compatible with the electrical system of your country.

Caution: The gateway will automatically power on when AC power is applied. There is no power switch. Check all boards, power supplies, and fan tray modules for proper insertion before plugging in a power cable.

Warning: Any yellow or red status LED is cause for concern and must be dealt with immediately.

It can take up to 5 minutes to boot up, during which time the status LED may indicate red.

Caution: After inserting a power cable and confirming the green system status LED is on; make sure that the Fan Status indicator shows green.

If the fan status indicator is not green then unplug the power connection and check that the fan module is inserted properly and that the mating connector of the fan unit is free of any dirt and/or obstacles.

Caution: When turning off the gateway, use the proper shut down procedure (see Section 2.4.6) and make sure **ALL LEDS** are off to ensure a powered down status.

Do not hot swap the power supply if your gateway has only one working power supply. You must power down the system to replace the power supply unit when there is only one working PSU in the gateway.

Figure 20: Two Power Inlets - Electric Caution Notifications

CAUTION

Risk of electric shock and energy hazard. The two PSUs are independent.

Disconnect all power supplies to ensure a powered down state inside of the gateway.

ACHTUNG

Gafahr des elektrischen Schocks. Entferrnen des Netzsteckers elnes Netzteils spannungsfrei. Um alle Einhieten spannungsfrei zu machen sind die Netzstecker aller Netzteile zu entfernen

ATTENTION

Risque de choc et de danger e'lectriques. Le de'branchment d'une seule alimentation stabilise'e ne de'branch uniquement qu'un module "Alimentation Stabilise'e". Pour isoler completement le module en cause, Il faut de'brancher toutes les alimentations stabilise'es.

2.4.6 Shut Down Procedure

If the Gateway is powered off for any reason without using the proper shut down procedure the Flash memory may be corrupted.

If the Flash memory is corrupted the Gateway may fail to boot. Should this happen, call your Mellanox representative for assistance.

To run the gateway through a power cycle

1. Run: `(config) # reload halt`
2. Wait long enough to let the gateway halt, and verify there is no ping to it.
3. Unplug the power cord.

Should the gateway fail to boot upon reinsertion of the power cord, burn the latest FW image to the Flash memory.

2.4.7 Extracting and Inserting the Power Supply Unit

With both power supplies installed in the redundant configuration, either PSU may be extracted without bringing down the system.

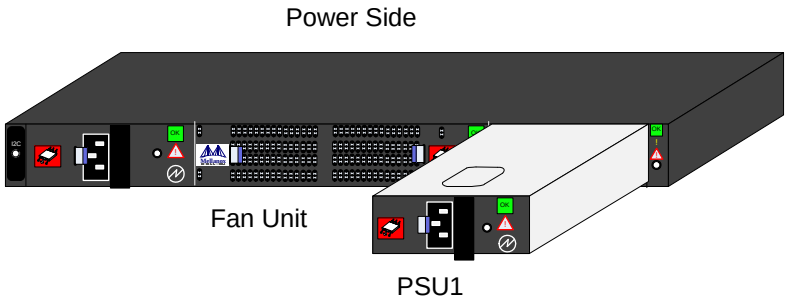
Make sure that the PSU that you are NOT replacing is showing all green, for both the PSU and status indicators.

If your system does not have a redundant power supply, you must bring down the system before you replace the PSU.

Power supply units have directional air flows similar to the fan module. The Fan module airflow must coincide with the airflow of all of the PSUs. If the PSU airflow direction is different from the fan module airflow direction the system will not cool properly.

2.4.7.1 To extract a PSU:

Figure 21: PSU Pulled Out



1. Remove the power cord from the power supply unit.
2. Grasping the handle with your right hand, push the latch release with your thumb while pulling the handle outward. As the PSU unseats, the PSU status indicators will turn off.
3. Remove the PSU.

2.4.7.2 To insert a PSU

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.

Do not attempt to insert the PSU with a power cord connected to it.

2. Insert the PSU by sliding it into the opening until a slight resistance is felt.

3. Continue pressing the PSU until it seats completely. The latch will snap into place confirming proper installation.
4. Insert the power cord into the supply connector.
5. Insert the other end of the power cord into an outlet of the correct voltage.

The PSU indicator should light green. If not, or if it is red, repeat the procedure starting with Section 2.4.7.1.

2.4.8 Cable Installation

All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The indicator, above each port, will light green when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with the other end of the connector plugged into a functioning port). After plugging in a cable, lock the connector using the latching mechanism particular to the cable vendor. When there is data transfer the light will blink green.

When installing cables make sure that the latch engages.

Always install and remove cables by pushing or pulling the cable and connector in a straight line with the gateway.

To remove, disengage the locks and slowly pull the connector away from the port receptacle. The LED indicator will turn off when the cable is unseated.

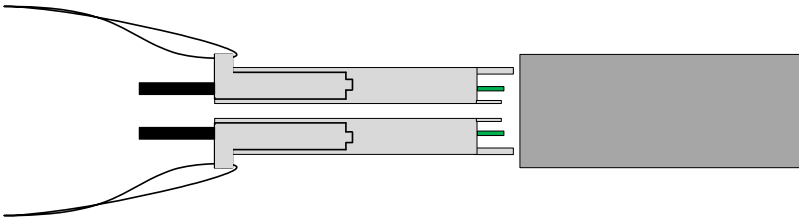
Care should be taken not to impede the air exhaust flow through the ventilation holes next to the ports. Cable lengths should be used which allow for routing horizontally around to the side of the chassis before bending upward or downward in the rack.

Cables, especially long copper cables, can weigh a substantial amount. Make sure that the weight of the cable is supported on its own and not hanging from the gateway.

These gateways are able to support direct attached copper cables, optical FC cables, and cables with media adapters at various lengths and gauges. Check www.mellanox.com => Products => Cables for cable recommendations regarding Mellanox approved cables and recommended maximum cable lengths.

Cables in the bottom row should be inserted up side down in relation to the how the cables are inserted in the top row.

Figure 22: Top and Bottom Ports



2.4.9 Extracting and Inserting the Fan Unit

Operation without a fan unit should not exceed one minute.
During fan hot-swap, if the LED indicators are OFF, then the fan unit is disconnected.

The gateway can run on three of the four fans at an ambient temperature of 45° C or less indefinitely.

There are two possible air flows for the fan unit. The air flow depends on the gateway model. An R in the model number indicates a connector (IB/ETH) side to power side air flow. See See “Part Numbering Legend” on page 9. for an explanation of the model numbers and labels.

Make sure that the fans have the air flow that matches the power units. An air flow opposite to the PSUs will cause the gateway to operate at a higher (less than optimal) temperature.

To extract a Fan Unit:

Fan Module Latches

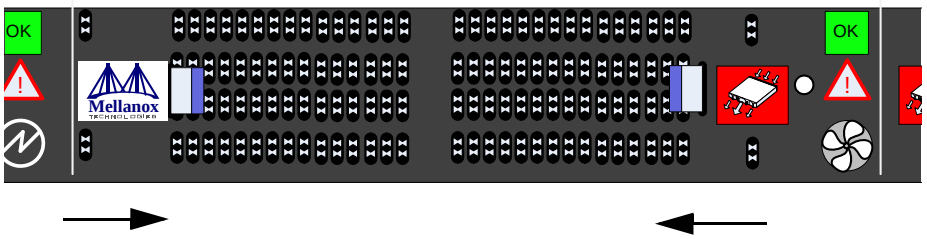
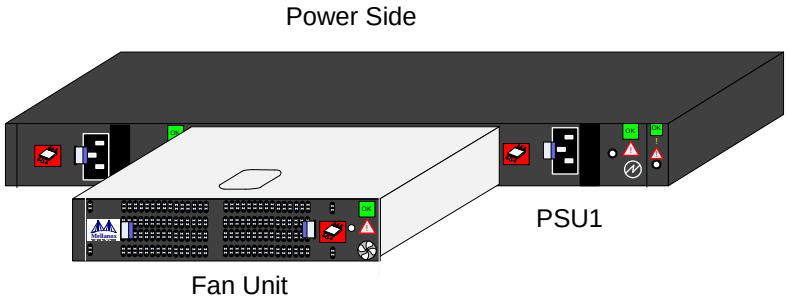


Figure 23: Fan Unit Pulled Out



1. Using two hands, push both latch releases in simultaneously while pulling the fan module out of the gateway. As the fan unseats, the fan status indicator will turn off.
2. Pull the fan unit out.

To insert a FAN Unit:

Make sure that the new fan unit has the correct air flow direction. This can be verified by checking the label on the fan unit and comparing it to the air flow label on the PSU.

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
2. Insert the fan unit by sliding it into the opening until slight resistance is felt. Continue pressing the fan unit until it seats completely.

The green fan status indicator should light. If not, extract the fan unit and reinsert it. After two unsuccessful attempts to install the fan unit, power off the gateway before attempting any system debug.

3 Management and Software

The BX 5020 series gateway contains a management module that gives the user the ability to manage the gateway. This management module runs Mellanox proprietary software. For information regarding the software see the *FabricIT BX Management Software CLI User's Manual.*

To access this document, download the User Manual from www.mellanox.com > Products > Gateway Software > Software and Documentation Download.
You will need a valid Mellanox Gateway S/N.

This chapter describes the management module and tools available for Out-of-Band management of the gateway system via FabricIT.

Each Ethernet port gets connected to Ethernet switches. These gateways must be configured to 10/100/1000M auto-negotiation.

3.1 FabricIT

FabricIT is a software based management system that can be run with either a command line interface or with a GUI interface. The GUI interface can be run through the Web.

See the FabricIT BXM User Manual for instructions and commands available to manage the gateways, and fabric.

4 Troubleshooting

As soon as a gateway is plugged in make sure that the green power LEDs on the PSU are on.

Power supply unit:

1. If the ~AC power LED is off, check that the power cable is plugged into a working outlet. Check that the power cable has a voltage within the range of 100 - 260 volts AC.
2. Remove and reinstall the power cable.
3. Replace the PSU.

The Status green power LED for PSU1 or PSU2 does not come on:

1. If the LED on the PSU is off, check that the Sys is off.
2. Remove and reinstall the power cable. Check that the power outlet (in the wall) is working.
3. Remove and reinstall the PSU. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
4. Replace the PSU.

The power LED for the gateway shuts off:

1. Check that the there is adequate ventilation.
2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
3. Use the FabricIT BXM manager to check the temperature of the gateway.
4. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the gateway using a vacuum cleaner.

The green power LED for the fans does not come on:

1. Check that the Power LEDs are on.
2. Remove and reinstall the fan unit. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.

Caution: Do not run the gateway if the System Status LED for the Fans is Red!

The link LED for the connector does not come on:

1. Check that both ends of the cable are connected.
2. Check that the locks on the ends are secured.
3. Make sure that the latest FW version is installed on both the HCA/ NIC cards and the gateway.
4. If media adapters are used, check that the all connections are good, tight, and secure.

The activity LED does not come on:

Check that the Subnet Manager has been started.

The management module does not start

1. Check that the OpenSM has been started.

Power Cycle the Gateway:

If the Gateway is powered off for any reason without using the proper shut down procedure the Flash memory may be corrupted.
If the Flash memory is corrupted the Gateway may fail to boot. If this happens talk to your Mellanox representative.

To run the gateway through a power cycle

1. Run: `(config) # reload halt`
2. Wait long enough to let the gateway halt, and verify there is no ping to it.
3. Unplug the power cord.
4. Plug in the power cord.

Gateway Fails to Boot:

1. Reburn the firmware to the Flash memory, using the MFT tools.

The FabricIT-BXM last software update did not succeed:

1. Connect the RS232 connector (CONSOLE) to a laptop.
2. Push the reset button on the gateway or management module.
3. You will have ~ 5 seconds to stop the U-Boot by pressing Control-B.
4. Choose the image to upload. Only use image 1 or image 2.

```
U-Boot 2009.01-mlnx1.4 (May 12 2010 - 14:08:15)

CPU:   AMCC PowerPC 460EX Rev. A at 1000 MHz (PLB=200, OPB=100, EBC=100
MHz)
      Security/Kasumi support
      Bootstrap Option H - Boot ROM Location I2C (Addr 0x52)
      Internal PCI arbiter disabled
      32 kB I-Cache 32 kB D-Cache
Board: Mellanox PPC460EX Board
FDEF: No
I2C:   ready
DRAM:   2 GB (ECC enabled, 400 MHz, CL3)
FLASH: 16 MB
NAND: 1024 MiB
PCI:   Bus Dev VenId DevId Class Int
PCIE0: link is not up.
PCIE1: successfully set as root-complex
       01 00 15b3 bd34 0c06 00
Net:   ppc_4xx_eth0, ppc_4xx_eth1
Hit Ctrl+B to stop autoboot: 0

Mellanox FabricIT
```

```
Boot Menu:
 1. EFM_PPC_M460EX EFM_1.1.1000 2010-06-24 16:32:03 ppc
 2. EFM_PPC_M460EX EFM_1.1.1200  2010-06-25  18 :00:03 ppc
 3. U-Boot prompt
 Choice:
```

5. Select the image to boot.

Appendix A: Specifications

Table 13 - BX5020-1S Specification Data

Physical		Power and Environmental	
Size:	1.74” (1U) H x 19” W x 21.26” D 44mm X 436mm X 629 mm	Input Voltage:	100 - 240VAC 50-60Hz
		Typ Power:	
Weight:	9.828kg / 21.67lbs	Passive cables:	62.44W or 213.05BTUs/hr
Mounting:	19” Rack mount	Active cables:	76.82W or 262.12BTUs/hr
SerDes Speeds	10, 20, 40 Gb/s per port	optical cables:	79.69W or 271.91BTUs/hr
Connectors and Cabling:	SFP SFP+ QSFP	Max Power: Passive cables: Active cables: optical cables:	 76.15W or 259.83BTUs/hr 95.76W or 326.75BTUs/hr 99.68W or 340.12BTUs/hr
Optical Cable Port Types:	SFP+ SR SFP+ LR SFP LC-LC SFP 1000BASE-T	Temperature: Humidity: Acoustics: Dissipated Power through: SFP+ QSFP	0° to 45° Celsius 10% - 90% non-condensing 7.2 Bel, 71.6 dB(A) 1.5W 2.0W
Protocol Support		**Regulatory Compliance**	
InfiniBand:	Auto-Negotiation of (40Gb/s, 20Gb/s, 10Gb/s)	Safety:	UL60950 C-UL to CAN/CSA 22 2 No.60950-1 TUV/GS to EN 60950-1, Amendment A1-A4, A11 CB-IEC60950-1, all country deviations
QoS:	8 InfiniBand Virtual Lanes for all ports		
Management:	Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management		
		EMC (Emissions):	CC 47CFR Part 15 Class A EN 55022 Class A ICES-003 Class A VCCI Class A AS/NZS CISPR 22 Class A CISPR 22 Class A EN 55024 EN 300386 CE
ETHERNET PORTS:	Ethernet over InfiniBand (EoIB) protocol encapsulation IEEE 802.3ae 10 Gigabit Ethernet IEEE 802.3z Gigabit Ethernet IEEE 802.1p QoS / COS IEEE 802.1Q VLAN Tagging IEEE 802.1AB Link Layer Discovery IEEE 802.3ad Link Aggregation with LACP IEEE 802.3x Flow Control (Per Priority Flow Control) Virtual lanes support Jumbo Frames support	Environmental:	EU: IEC 60068-2-64: Random Vibration EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test

Table 13 - BX5020-1S Specification Data

Scalability and Performance		**Reliability, Availability and Serviceability Features**	
Switching Performance:	Simultaneous wire-speed any port to any port	Hot-Swappable: 1+1 Redundant:	Fan Module and Power Supplies
Addressing:	48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet		
Bridging Capacity	320Gb/s		

Appendix B: EMC Certifications

B.1 EMC Certifications

The list of approved certifications per gateway in different regions of the world is located on the Mellanox Website at:

www.mellanox.com/related-docs/user_manuals/Regulatory_and_Compliance_Guide.pdf

EMC Statements are also in the Regulatory and Compliance Guide.

Appendix C: Interface Connector Pinouts

C.1 SFP+ Interface

Figure 24: SFP+ Connector Pinout - Rear View of Module With Pin Placement

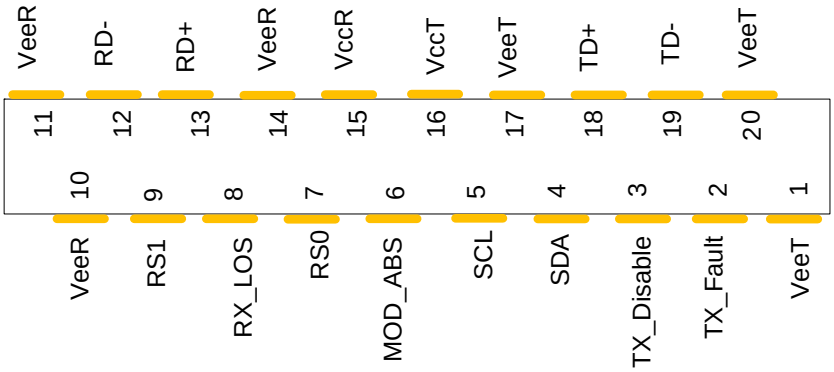


Table 14 - SFP+ Pinout

Pin	Symbol Name	Description
1	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
2	TX_Fault	Transmitter Fault.[b]
3	TX_Disable	Transmitter Disable. Laser output disabled on high or open. [c]
4	SDA	2-wire Serial Interface Data Line [d]
5	SCL	2-wire Serial Interface Clock Line [d]
6	MOD_ABS	Module Absent. Grounded within the module [d]
7	RS0	No connection required
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation. [e]
9	RS1	No connection required
10	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
11	VeeR	Receiver Ground (Common with Transmitter Ground)[a]
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver Non-inverted DATA out. AC Coupled
14	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
15	VccR	Receiver Power Supply

Table 14 - SFP+ Pinout

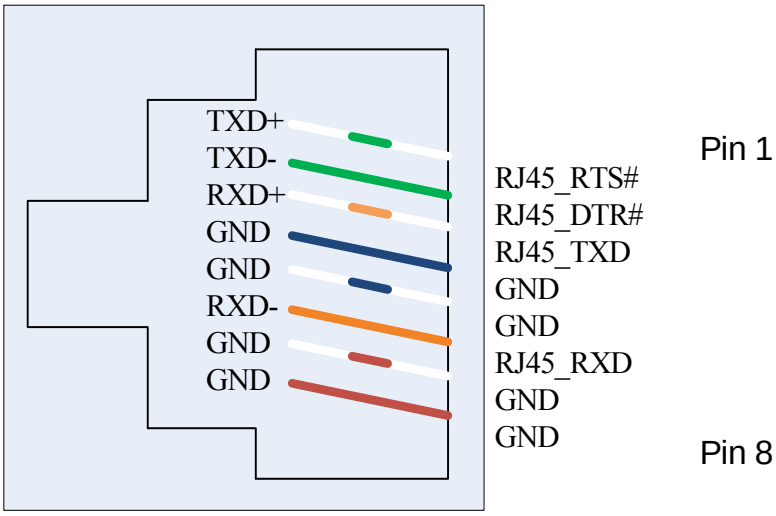
Pin	Symbol Name	Description
16	VccT	Transmitter Power Supply
17	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.
19	TD-	Transmitter Inverted DATA in. AC Coupled.
20	VeeT	Transmitter Ground (Common with Receiver Ground)[a]

a. Circuit ground is internally isolated from chassis ground.
b. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
c. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V
d. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
e. LOS is open collector output. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

C.2 RS232 to RJ45 Connector Interface

Figure 25: RJ45 Connector Pinout

CONSOLE

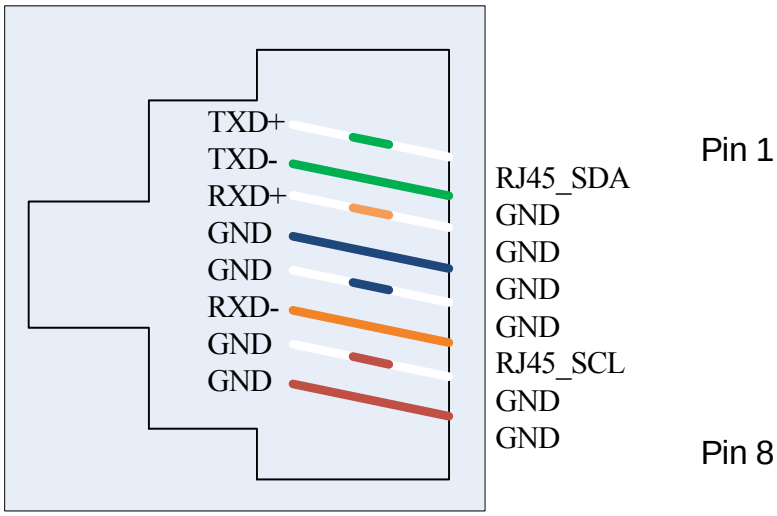


Looking into the Socket

C.3 I2C RJ45 Connector Interface Pinout

Figure 26: I2C Pinouts

I^2C



Looking into the Socket

C.4 QSFP Connector Pinout

Figure 27: QSFP Connector Pinout

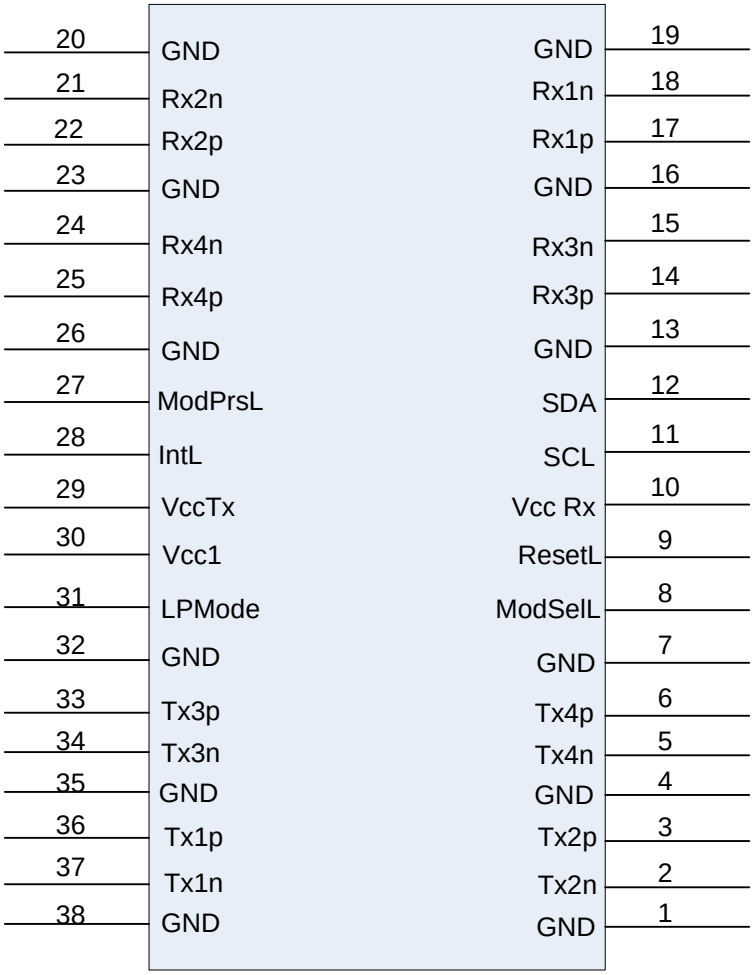
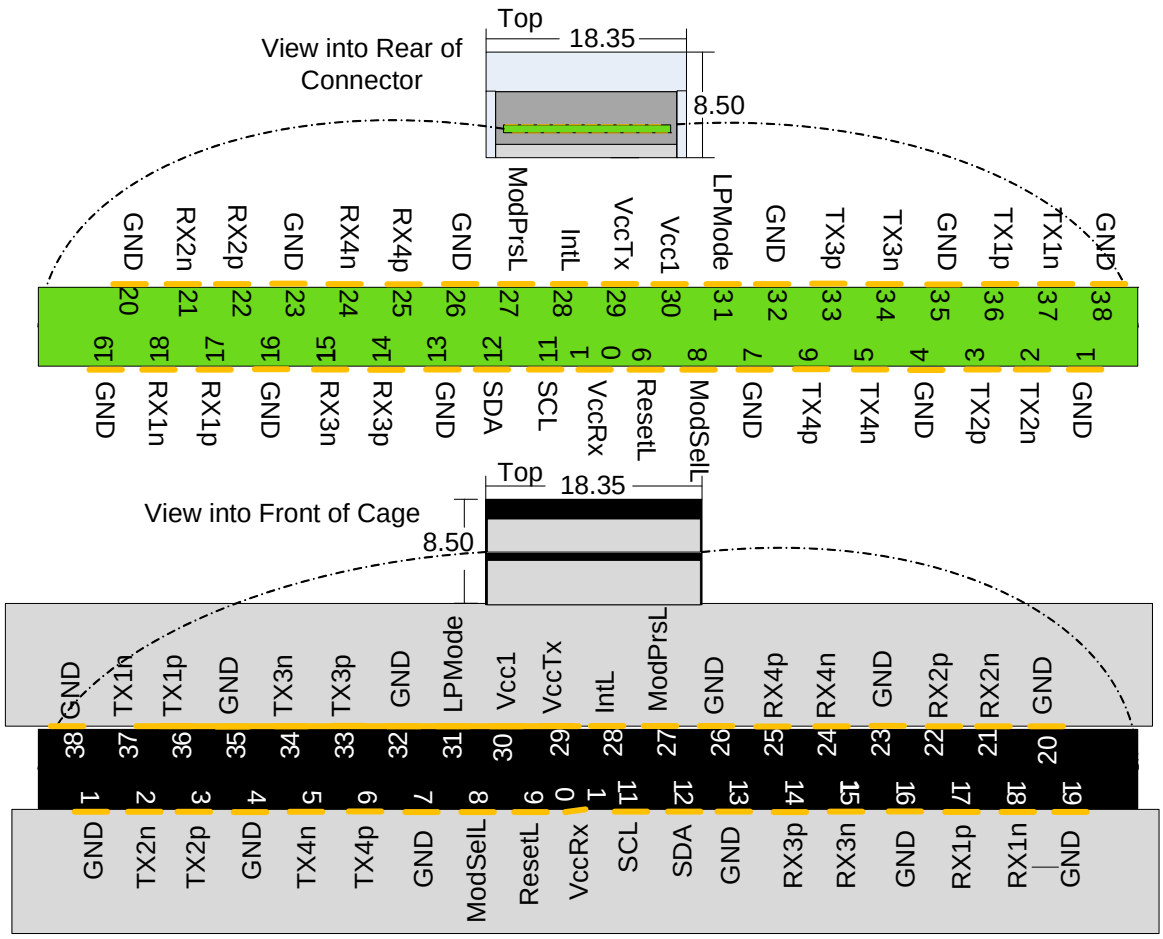


Figure 28: Pinout Looking Into the Rear of the Connector and the Front of the Cage


Top
View into Rear of Connector
18.35
8.50
GND RX2n RX2p GND RX4n RX4p GND ModPrsL IntL VccTx Vcc1 LPMode GND TX3p TX3n GND TX1p TX1n GND
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
GND RX1n RX1p GND RX3n RX3p GND SDA SCL VccRx ResetL ModSelL GND TX4p TX4n GND TX2p TX2n GND
Top
View into Front of Cage
18.35
8.50
GND TX1n TX1p GND TX3n TX3p GND LPMode Vcc1 VccTx IntL ModPrsL GND RX4p RX4n GND RX2p RX2n GND
38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
GND TX2n TX2p GND TX4n TX4p GND ModSelL ResetL VccRx SCL SDA GND RX3p RX3n GND RX1p RX1n GND

Appendix D: Replacement Parts Ordering Numbers

Table 15 - Replacement Parts Ordering Numbers

Part Description	Product Number
Power Supply Unit PSU connector (IB/ETH) side to Power side airflow. This Replacement part is for both the PSU 1 and PSU 2.	MIS000053
Power Supply Unit PSU Power side to connector (IB/ETH) side airflow. This Replacement part is for both the PSU 1 and PSU 2.	MIS000054
Power supply blank	MIS000055
Rack installation kit (standard depth gateway standard rack)	MIS000085
Rack installation kit (Short gateway standard rack)	MIS000083
Rack installation kit (short gateway short rack)	MIS000079
Harness RS232 to DB9 2M long cable	HAR000028
Fan Unit for Power side to connector (IB/ETH) side air flow	MIS000051
Fan Unit for connector (IB/ETH) side to Power side air flow	MIS000082
Power cord Type C13-C14	ACC000251

Appendix E: Avertissements de sécurité d'installation (French)

1. Instructions d'installation

Lisez toutes les instructions d'installation avant de brancher le matériel à la source d'alimentation électrique.

2. Température excessive

Ce matériel ne doit pas fonctionner dans une zone avec une température ambiante dépassant le maximum recommandé de 45°C (113°F). Un flux d'air de 200LFM à cette température ambiante maximale est nécessaire. En outre, pour garantir un bon écoulement de l'air, laissez au moins 8 cm (3 pouces) d'espace libre autour des ouvertures de ventilation.

3. Empilage du châssis

Le châssis ne doit pas être empilé sur un autre matériel. Si le châssis tombe, il peut provoquer des blessures corporelles et des dégradations de biens.

4. Connection d'Alimentation electrique excedentaire -dangers électriques

Ce produit comporte un couvercle transparent sur l'espace pour l'alimentation électrique redondante.
Ne pas faire fonctionner le produit si le couvercle transparent n'est pas solidement fixé ou s'il est enlevé.

5. Orages – dangers électriques

Pendant un orage, il ne faut pas utiliser le matériel et il ne faut pas brancher ou débrancher les câbles.

6. Branchement/débranchement des câbles InfiniBand en cuivre

Les câbles InfiniBand en cuivre sont lourds et ne sont pas flexibles, il faut donc faire très attention en les branchant et en les débranchant des connecteurs. Consultez le fabricant des câbles pour connaître les mises en garde et les instructions spéciales.

7. Montage et entretien sur baie

Lorsque ce produit est monté ou entretenu sur baie, il faut prendre des précautions spéciales pour s'assurer que le système reste stable. En général, il faut remplir la baie avec du matériel de bas en haut.

8. Fuite>3.5mA Leakage >3.5mA

« ATTENTION – La connexion à la terre des forts courants de fuite est essentielle avant le branchement de l'alimentation. »
Avant de brancher l'appareil à la conduite d'alimentation, les vis de protection à la terre du terminal de l'appareil doivent être appliquées à l'installation de protection à la Terre du bâtiment.

9. Forts Courants de Fuite High Leakage Current

Attention: Forts courants de fuite. Il est essentiel de relier a la terre avant de brancher l'alimentation.

10. Ajouter une information de connexion à la masse Connect a Valid Ground to this Device

Avant de brancher l'appareil à la conduite d'alimentation, les vis de protection à la terre du terminal de l'appareil doivent être appliquées à l'installation de protection à la Terre du bâtiment.

11. Installation du matériel

Ce matériel ne doit être installé, remplacé ou entretenu que par du personnel formé et qualifié.

12. Elimination du matériel

L'élimination de ce matériel doit s'effectuer dans le respect de toutes les législations et réglementations nationales en vigueur.

13. Codes électriques locaux et nationaux

Ce matériel doit être installé dans le respect des codes électriques locaux et nationaux.

14. Codes d'installation INSTALLATION CODES

L'appareil doit être installé selon l'ancienne version des codes électriques nationaux du pays. Pour l'Amérique du Nord, l'équipement doit être installé conformément aux spécifications du Code Electrique National Américain et du Code Electrique Canadien.

15. Interconnexion des unites INTERCONNECTION OF UNITS

Les câbles de branchement à l'unité RS232 et les interfaces Ethernet doivent être certifiés UL de type DP-1 ou DP-2. (Note - lorsqu'il existe dans un circuit non LPS)

Protection contre la surintensité : Un appareil de protection répertorié facilement accessible contre la surintensité du circuit de branchement et calibré à 20A doit être incorporé dans le câblage électrique du bâtiment.

16. Exposition au rayonnement grave

Mise en garde – l'utilisation de commandes ou de réglages ou l'exécution de procédures autres que ce qui est spécifié dans les présentes peut engendrer une exposition au rayonnement grave.

PRODUIT LASER DE CLASSE 1 » et références aux normes laser les plus récentes CEI 60 825-1:1993 + A1:1997 + A2:2001 et NE 60825-1:1994+A1:1996+ A2:2001

17. S'assurer que les enceintes sont appropriées

Des enceintes électriques, mécaniques et incendie adaptées doivent être fournies par le fabricant du produit final ou par l'utilisateur final.

18. Cordons électriques CA homologués UL

Pour les prises électriques en Amérique du Nord, choisissez un cordon électrique homologué UL et certifié CSA

à 3 conducteurs, [18 AWG], terminé par une fiche moulée, d'une tension nominale de 125 V, [15 A], avec une longueur minimale de 1,5 m [6 pieds] et d'une longueur maximale de 4,5 m [18 pieds]

Pour les prises électriques en Europe, choisissez un cordon électrique harmonisé internationalement et marqué "<HAR>",

à 3 conducteurs, d'un diamètre de fil minimum de 0,75 mm2, d'une tension nominale de 300 V, avec une gaine isolée en PVC. Le cordon doit avoir une fiche moulée d'une tension nominale de 250 V et d'une intensité nominale de 10 A.

Anhang F: Installation - Sicherheitshinweise (German)

1. Installationsanleitungen

Lesen Sie alle Installationsanleitungen, bevor Sie das Gerät an die Stromversorgung anschließen.

2. Übertemperatur

Dieses Gerät sollte nicht in einem Bereich mit einer Umgebungstemperatur über der maximal empfohlenen Temperatur von 45°C (113°F) betrieben werden. Es ist ein Luftstrom von 200 LFM bei maximaler Umgebungstemperatur erforderlich. Außerdem sollten mindestens 8 cm (3 in.) Freiraum um die Belüftungsöffnungen sein, um einen einwandfreien Luftstrom zu gewährleisten.

3. Stapeln des Chassis

Das Chassis sollte nicht auf andere Geräte gestapelt werden. Wenn das Chassis herunterfällt, kann es zu Verletzungen und Beschädigungen an Geräten führen.

4. Redundanter Stromversorgungsanschluss - Elektrische Gefahr

Dieses Produkt verfügt über eine Abdeckung über dem Bereich für die redundante Stromversorgung. Betreiben Sie das Produkt nicht, wenn diese Abdeckung nicht sicher festsitzt oder entfernt wurde.

5. Bei Gewitter - Elektrische Gefahr

Arbeiten Sie während eines Gewitters und Blitzschlag nicht am Gerät, schließen Sie keine Kabel an oder ab.

6. Anschließen/Trennen von InfiniBand-Kupferkabel

InfiniBand-Kupferkabel sind schwer und nicht flexible. Deshalb müssen sie vorsichtig an die Anschlüsse angebracht bzw. davon getrennt werden. Lesen Sie die speziellen Warnungen und Anleitungen des Kabelherstellers.

7. Rack-Montage und Wartung

Wenn dieses Produkt in einem Rack montiert oder gewartet wird, sind besondere Vorsichtsmaßnahmen zu ergreifen, um die Stabilität des Systems zu gewährleisten. Im Allgemeinen sollten Sie das Gestell von unten nach oben mit Geräten füllen.

8. Geräteinstallation

Diese Gerät sollte nur von geschultem und qualifiziertem Personal installiert, ausgetauscht oder gewartet werden.

9. Geräteentsorgung

Die Entsorgung dieses Geräts sollte unter Beachtung aller nationalen Gesetze Bestimmungen erfolgen.

10. Regionale und nationale elektrische Bestimmungen

Dieses Gerät sollte unter Beachtung der regionalen und nationalen elektrischen Bestimmungen installiert werden.

11. Richtigen Schutz sicherstellen

Geeigneter elekrischer, mechanischer und Feuerschutz sind vom Hersteller des Endprodukts oder dem Endbenutzer bereitzustellen.

12. Strahlenkontakt

Achtung – Nutzung von Steuerungen oder Einstellungen oder Ausführung von Prozeduren, die hier nicht spezifiziert sind, kann zu gefährlichem Strahlenkontakt führen..

Klasse 1 Laserprodukt und Referenzen zu den aktuellsten Lasterstandards :
ICE 60 825-1:1993 + A1:1997 + A2:2001 und EN 60825-1:1994+A1:1996+ A2:2001

13. UL-und CSA Certified Netzkabel UL Listed and CSA Certified Power Supply Cord

Für Nordamerika Stromanschluss, wählen Sie ein Netzkabel, das UL-und CSA Certified
3 - Leiter, [18 AWG], mit einem angespritztem Stecker bewertet bei 125 V, [15], mit einer Mindestlänge von 1,5 m [Six Feet] aber nicht mehr als 4,5 m.
Für die europäischen Zusammenhang, wählen Sie ein Netzkabel, das international harmonisiert und der Aufschrift "<HAR>",
3 - Leiter, mindestens 0,75 mm2 Draht, bewertet mit 300 V, mit einem PVC-Mantel isoliert. Das Kabel muss eine angespritztem Stecker bewertet bei 250 V, 10 A. "

14. Ableitstrom> 3.5mA LEAKAGE >3.5mA

WARNUNG: Hohe Ableitstrom; Earth Verbindung, bevor Sie die Verbindung von wesentlicher Bedeutung werden.

15. Add GND Verbindung Informationen Add GND connection information

Bevor Sie dieses Gerät an das Stromnetz, die Schutzerde Terminal Schrauben dieses Gerät muss an den Schutzleiter in der Gebäudeinstallation.

16. INSTALLATION CODES INSTALLATION CODES

Dieses Gerät muss installiert sein, entsprechend auf die neueste Version des Landes National Electrical Code. Für Nordamerika, müssen in Übereinstimmung mit den geltenden Vorschriften in der US-amerikanischen National Electrical Code und dem Canadian Electrical Code.

17. Zusammenschaltung von EINHEITEN INTERCONNECTION OF UNITS

Kabel für den Anschluss an das Gerät RS232-und Ethernet-Schnittstellen müssen UL zertifiziert Typ DP-1 oder DP-2. (Hinweis-, wenn nicht mit Wohnsitz in LPS-Schaltung)

Überstromschutz: Eine leicht zugängliche Auflistung Abzweigleitung Überstrom-Schutzeinrichtung 20 A bewertet werden müssen in dem Gebäude Verkabelung.

Appendix G: Advertencias de seguridad para la instalación (Spanish)

1. Instrucciones de instalación

Antes de conectar el equipo a la fuente de alimentación, leer todas las instrucciones de instalación.

2. Instalación en un lugar con acceso restringido.

Esta unidad ha sido ideada para instalar en lugares de acceso restringido.

3. Sobrecalentamiento

No se debe utilizar el equipo en un área con una temperatura ambiente superior a la máxima recomendada: 45°C. Además, para garantizar una circulación de aire adecuada, se debe dejar como mínimo un espacio de 8 cm (3 pulgadas) alrededor de las aberturas de ventilación.

4. Apilamiento del chasis

Los chasis no se deben apilar sobre otros equipos. La caída del chasis podría causar lesiones corporales, así como daños al equipo.

5. Conexión de fuente de alimentación redundante: peligro de descarga eléctrica

Este producto incluye una fuente de alimentación redundante o, en su lugar, una vacía. Si se dispone de una fuente de alimentación vacía, no utilizar el producto si su tapa está quitada o no está bien cerrada.

6. Cuando hay rayos: peligro de descarga eléctrica

No utilizar el equipo ni conectar o desconectar cables durante períodos de actividad de rayos.

7. Conexión y desconexión del cable Copper InfiniBand

Dado que los cables de cobre InfiniBand son pesados y no son flexibles, su conexión a los conectores y su desconexión se deben efectuar con mucho cuidado. Para ver advertencias o instrucciones especiales, consultar al fabricante del cable.

8. Montaje y mantenimiento de bastidores

Al instalar o realizar el mantenimiento de este aparato en un bastidor, es preciso adoptar precauciones especiales para garantizar que el sistema se mantenga estable. En general, en un bastidor, los equipos se deben instalar comenzando desde abajo hacia arriba.

9. Instalación de equipos

La instalación, el reemplazo y el mantenimiento de este equipo estarán a cargo únicamente de personal capacitado y competente.

10. Asegurar confinamientos adecuados

El fabricante del producto final o el usuario final deberán suministrar un confinamiento adecuado para componentes eléctricos y mecánicos y contra incendio.

11. Eliminación de equipos

La eliminación definitiva de este equipo se debe efectuar conforme a todas las leyes y reglamentaciones nacionales.

12. Códigos eléctricos locales y nacionales

Este equipo se debe instalar conforme a los códigos eléctricos locales y nacionales.

13. Cable de alimentación homologado por UL y con certificación CSA Fuga > 3,5 mA

En conexiones de América del Norte, seleccionar un cable de alimentación homologado por UL y con certificación CSA de tres conductores, [16 AWG], terminado en un enchufe moldeado con capuchón de 125 voltios nominal, [13 A], con una longitud mínima de 1,5 metros, pero no más de 4,5 metros.

En conexiones europeas, seleccionar un cable de alimentación armonizado internacionalmente y marcado "<HAR>", de tres conductores, hilo de 1,0 mm2 como mínimo, 300 voltios nominal, con cobertura protectora aislante de PVC. El cable debe tener un enchufe moldeado con capuchón de 250 voltios nominal, 10 A.

ADVERTENCIA: Alta corriente de fuga. Es esencial efectuar la conexión a tierra antes de conectar la alimentación.

14. Añadir conexión a tierra

Antes de conectar el dispositivo a la línea de alimentación, los tornillos del terminal de la puesta a tierra de protección del dispositivo se deben conectar a la puesta a tierra de protección de la instalación del edificio.

(Información de conexión a tierra):

La instalación del edificio deberá prover un medio para la conexión con la puesta a tierra de protección y un técnico de servicio deberá conectar permanentemente el equipo a dicho medio de conexión.

Un TÉCNICO DE SERVICIO comprobará si la toma eléctrica de la que se suministrará corriente al equipo provee una conexión con la puesta a tierra de protección del edificio. De no ser así, el TÉCNICO DE SERVICIO se encargará de instalar un CONDUCTOR DE CONEXIÓN A TIERRA DE PROTECCIÓN, del terminal de puesta a tierra de protección separado al conductor de tierra de protección del edificio. El equipo se instalará en un área donde haya conexión equipotencial, como por ejemplo, un centro de telecomunicaciones o una sala de computadoras dedicada.

15. Códigos de instalación

Este dispositivo se debe instalar conforme a la versión más reciente de los códigos eléctricos nacionales del país en cuestión. En América del Norte, el equipo se debe instalar de acuerdo con las disposiciones vigentes del Código Eléctrico Nacional de los EE.UU. y del Código Eléctrico de Canadá.

16. Interconexión de unidades

Los cables para la conexión con las interfaces RS232 y Ethernet de la unidad deben estar homologados por UL tipo DP-1 o DP-2. (Nota: cuando residen en circuito no de tipo LPS)

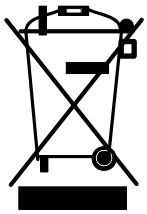
Protección contra sobrecargas: Al cableado del edificio se debe incorporar un dispositivo de protección contra sobrecargas de circuito derivado, de fácil acceso, con una corriente nominal de 20 A.

17. Exposición a niveles de radiación peligrosos

Precaución: el uso de controles o ajustes o la realización de procedimientos distintos de los que aquí se especifican podrían causar exposición a niveles de radiación peligrosos.

PRODUCTO LÁSER DE CLASE 1 y referencia a las normas de láser más recientes: IEC 60825-1:2007/03 y EN 60825-1:2007

18. Directiva sobre RAEE



Conforme a la Directiva 2002/96/CE sobre RAEE, todos los residuos de equipos eléctricos y electrónicos (EEE) se deben recolectar por separado y no se deben eliminar junto con residuos domésticos.

Al deshacerse de este producto y de todas sus partes, hágalo de una manera responsable y respetuosa con el medio ambiente.

Appendix H: SFP+ Modules

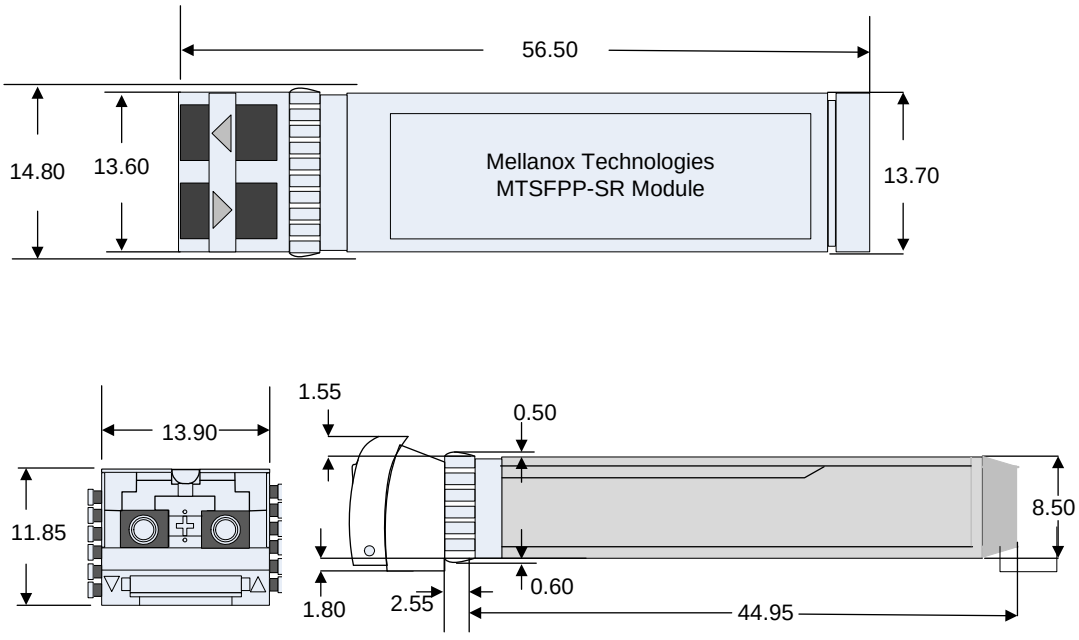
H.1 Product Features

- Hot-pluggable SFP+ footprint
- Maximum link length of 300m on 2000 MHZ-km MMF
- Supports 9.95 to 10.3 Gb/s bit rates*
- Power dissipation < 1W
- Commercial temperature range 0°C to 70°C
- Single 3.3Vpower supply
- Uncooled 850nm VCSEL laser
- Receiver limiting electrical interface
- Duplex LC connector
- Built-in digital diagnostic functions
- RoHS-6 compliant (lead-free)

H.2 Applications

- 10GBASE-SR/SW 10G Ethernet

H.3 Dimensions



H.4 Pin Descriptions

Figure 29: Rear View of Module With Pin Placement

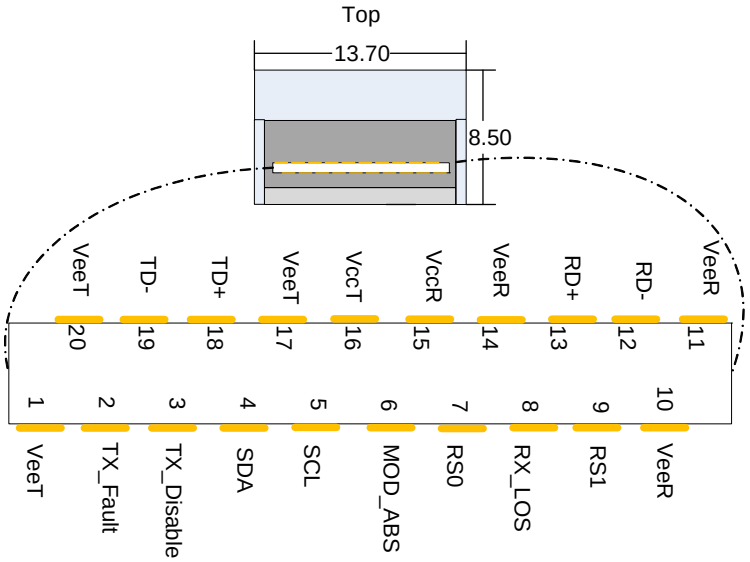


Table 16 - SFP+ Pinout

Pin	Symbol Name	Description
1	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
2	TX_Fault	Transmitter Fault.[b]
3	TX_Disable	Transmitter Disable. Laser output disabled on high or open. [c]
4	SDA	2-wire Serial Interface Data Line [d]
5	SCL	2-wire Serial Interface Clock Line [d]
6	MOD_ABS	Module Absent. Grounded within the module [d]
7	RS0	No connection required
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation. [e]
9	RS1	No connection required
10	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
11	VeeR	Receiver Ground (Common with Transmitter Ground)[a]

Pin	Symbol Name	Description
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver Non-inverted DATA out. AC Coupled
14	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
15	VccR	Receiver Power Supply
16	VccT	Transmitter Power Supply
17	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.
19	TD-	Transmitter Inverted DATA in. AC Coupled.
20	VeeT	Transmitter Ground (Common with Receiver Ground)[a]

a. Circuit ground is internally isolated from chassis ground.
b. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
c. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V
d. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
e. LOS is open collector output. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

H.5 Power Dissipation

Max power dissipation 1.00 W